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The Importance of Cognition and Moderator Variables in Stress

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Despite extensive study of stress and anxiety, many researchers remain dismayed at the large amount of inter- and intraindividual variability in response to challenging situations. One attempt to solve this problem of too much unexplained variance has been the use of an interactional approach that assesses how the characteristics of the individual and those of the situation work simultaneously and in interaction to produce behavior in a stress-causing situation. This paper suggests a cognitive paradigm that emphasizes the role of moderator variables, both individual and situational, as a method of better understanding this interaction.

PERSONS AND SITUATIONS IN INTERACTION

Efforts to cut down the variability of responses among individuals in particular situations have for the past few years concentrated on the interactive effects of various types of individual differences and particular environmental situations. From this perspective, a key concept is salience, the perceptual "pull value" of situations and their motivational significance. The universally salient situation evokes a standard response because it is compelling to everyone. Some situations are universally salient because most people have learned the same meaning for a particular cue. For example, when a stop light turns red most automobile drivers stop. Other situations are universally salient because their overwhelming characteristics evoke similar stress reactions in large numbers of people. Severe earthquakes, catastrophic fires, bridge collapses, mass riots, and nuclear explosions are examples of this type of stress-producing situation. Sometimes, however, when environmental conditions are not stereotyped or extreme, personal salience plays a major role in influencing behavior by directing attention to the particular elements of a situation that have personal significance. Hearing a particular song may evoke a grief reaction or feelings of nostalgia or a

relaxed state depending on whether it was associated with someone who died recently, someone who is away and whose return is uncertain, or with happy memories of a high school romance.

Thus, some situations may not initially be experienced as stressful, but, because of learning that subsequently takes place, become capable of arousing stress responses. Both the classical conditioning situation and the operant paradigm deal with the ability of past experience to provoke stress responses in an originally non-stressful situation. The following classical conditioning situation illustrates this point.

unconditioned stimulus → unconditioned response
car crash and resulting injury → stress reaction
 conditioned stimulus → conditioned response
car → stress reaction (anxiety)

Although the car was originally not a stressful stimulus, it takes on that characteristic because of the conditioned stress reaction resulting from the earlier accident. Many stimuli experienced daily in the environment take on stress-producing characteristics for the individual as a result of this classical conditioning process. An operant learning situation with a discriminative stimulus can also be the basis for a stress response. An animal in an avoidance conditioning situation learns that jumping to the other side of the shuttle box will allow escape from the discomfort of an electrified grid. A light is introduced as a discriminative stimulus. Now the animal learns that the grid will be electrified only when the light is turned on. Conditioning has produced a stress response to the light. Even if the animal uses illumination as a cue to jump and therefore escape the shock, the illumination produces a heightened physiological state.

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Behavior that is strongly influenced by genetic or ontogenetic processes tends to unfold in an orderly manner, except under abnormal conditions. However, when environmental conditions are not stereotyped or extreme and when heredity or development does not play a dominant role, personal salience is a major influence on behavior because it directs attention to the particular elements of a situation that have personal significance. An interactional approach must be concerned with what characteristics of people contribute to personal salience, how these characteristics are shaped and modified by experience, and how situations can be arranged so as to increase or decrease personal salience.

Researchers and theorists might agree completely about the importance of personal salience and yet direct their attention to quite different person and situation variables. Agreement about the importance of person X situation interactions does not provide answers to such questions as: How do you assess personal characteristics? Which situational elements are likely to evoke high levels of salience? Which are the most relevant response measures? Answers to these questions do not so much flow from the application of general methodological principles as from the judgments and hunches of researchers.

A COGNITIVE VIEW OF STRESS AND ANXIETY

Anxiety and stress have figured prominently as variables in studies using the person X situation approach. Because writers have attended to different things taking place in the interaction, theories of stress and anxiety have ranged widely in their definitions of these variables.

Stress

Stress, for example, has been defined variously as a stimulus, a response, and a hypothetical state. The preponderant view at the present time seems to

be that it is something occurring within the organism rather than a characteristic of the situation. Stress, then, can be understood in cognitive terms. It involves two kinds of appraisals: of situations or tasks, and of the individual's ability to deal successfully with them. These appraisals are arrived at in response to a call for action, defined as a situational demand, constraint, or opportunity of which the individual seeks to take advantage (McGrath, 1976). Calls for action vary in urgency and become stressful when they lead to such cognitions as, "I'm on the spot," and, "I've got to do something," and where success is not certain. While stressful cognitions, like other cognitions, involve information-processing, they are influenced particularly by the need to act and uncertainty about the outcome.

The most adaptive response to stress is a task-orientation which directs the individual's attention to the task at hand, rather than emotional reactions. The ability to set aside unproductive worries and preoccupations seems to be crucial in functioning well under pressure. There are wide individual differences in the frequency and preoccupying character of stress-related cognitions. Some of the problems of stress are problems of personal salience of situations. Whether danger will be seen in a situation depends as much on the individual as on the situation. Consequently, an understanding of the effects of stress and prediction of individual behavior must take into account the individual's perceptions both of the demands of the situation and his or her ability to meet them.

The chain of events involved in stress begins with a problematic situation. A call for action is issued when either the environment or personal concerns identify the need to do something. What is done varies widely. Stress follows the call for action when one's capabilities are perceived as falling short of the needed personal resources. For example, in automobile driving, personal ability is usually perceived as commensurate with the situational

challenge and the call for action is handled in a routine, task-oriented manner. However, stress may well up on treacherous mountain roads among persons who are not confident of their ability in that situation. While some people are able to maintain a task-orientation in the face of the call, for others, self-preoccupation often interferes with realistic planning and weighing of alternatives. Anecdotal evidence from many sources also suggests that individuals use different cognitive patterns in stressful situations and that these cognitions may be important in determining the level of adaptability of ensuing behavior.

John Johnson (1956), Britain's top fighter ace in the Second World War, has provided an interesting illustration of personal salience in combat. In characterizing pilots on the ground immediately before a mission, he noted that they fell into two groups.

"It is fascinating to watch the reactions of the various pilots. They fall into two broad categories; those who are going to shoot and those who secretly and desperately know that they will be shot at . . ."

Johnson proceeded to describe how most of the pilots tie on their mae-vests, check their maps, study the weather forecasts and engage in last minute conversation with their ground crews or wingmen. He labeled these men the "hunters." The others are then described:

"The hunted, that very small minority (although every squadron possessed at least one), turned to their escape kits and made quite sure that they were wearing the tunic with silk maps sewn into the secret hiding place; that they had at least one oilskin-covered packet of French francs, and two if possible; that they had a compass and a revolver and sometimes specially made clothes to assist their activities once they were shot down. When they went through these agonized preparations they reminded me of aged countrywomen meticulously checking their shopping lists before catching the bus for the market

town."

It seems likely that these two groups' differing behavior was accomplished by very different cognitions concerning the outcome of the mission.

Whereas the research focus for many years had been on the conditions under which stress is generated, emphasis recently has been on understanding coping mechanisms. In Vaillant's (1974, 1977) report of a study of college students' adjustment over a 30-year period after leaving school, evidence is presented suggesting that pervasive personal preoccupations are maladaptive in various areas, including work and marriage and that successful adjustment is associated with a task-orientation and suppression of other cognitions. One of the best examples of the ability to maintain a dispassionate task-orientation in the face of severe challenge is Winston Churchill's account of events shortly before becoming Prime Minister in the face of war?

" . . . by the afternoon I became aware that I might well be called to take the lead (office of Prime Minister). The prospect neither excited nor alarmed me. I thought it would be by far the best plan."
(Sir Winston Churchill, The Gathering Storm).

While there is good reason to emphasize the role of preoccupying thoughts intervening between situation and response, how these personal preoccupations are formed and their physiological correlates are factors of great importance. Because personal preoccupations cannot be observed directly, objective bases for drawing inferences about them are necessary. That a laboratory approach can play a useful role in the inferential process is illustrated by research on test anxiety. Perhaps the regularities uncovered in this research are due to the relative ease with which evaluative situations can be defined.

Anxiety

While stress is a call for action determined by an appraisal of the properties of situations and personal dispositions, anxiety is a self-preoccupying response to
perceived danger

and inability to handle a challenge or unfinished business in a satisfactory manner. The anxious person feels unable to respond to that call for action. This view of anxiety as a state marked by heightened self-awareness and perceived helplessness is similar to Freud's concept of anxiety. Some situations may be anxiety provoking for most people. Their demands may be so great that few people perceive themselves as able to cope. Other situations may produce this feeling of inability to respond only in certain types of people, those who are characteristically anxious or people who are anxious only because of some specifics of the situation, for example, those who are anxious in evaluative or testing situations. This self-preoccupation of the anxious person, even in apparently neutral or even pleasant situations, may be due to a history of experiences marked by a relative paucity of signals indicating that a safe haven from danger has been reached. For the anxiety researcher, the challenge is to relate individual difference in cognitive appraisals of situations and then to build competencies based on this information.

People come to terms with their anxieties in different ways. Some highly anxious individuals are helped by learning to be less demanding of themselves. Others benefit when they revise their expectations about the consequences of failure. They catastrophize less, and attend to the task more. Still others need to strengthen their behavioral repertory in specific ways such as strengthening study skills.

A cognitive method to reduce the negative effect of anxiety on performance has been found to be a successful approach. In one study (Sarason, 1973), subjects differing in test anxiety were given the opportunity to observe a model who demonstrated effective ways of performing the task. Using a talk-out-loud technique, the model displayed several facilitative thoughts and cognitions. The major finding was that high test anxiety subjects benefited more from

the opportunity to observe a cognitive model than did low test anxiety scorers.

When interventions are successful in reducing evaluative anxiety, there is a commensurate increase in self-efficacy. Bandura (1977) has described persons high in self-efficacy as seeing themselves as personally effective and able. These positive self-appraisals presumably result from personal successes and reinforcements following the successes. Persons experience increments of self-efficacy when they observe connections between their behavior and tasks that are successfully completed. One reason why these highly anxious persons are low in self-efficacy is that they are so preoccupied with fear of failure, catastrophizing, and blaming themselves. Put another way, they attend too often to what is going on within themselves and become diverted from the step-by-step approach needed in meeting problematic situations.

MODERATOR VARIABLES

Although the person X situation interaction approach and the emphasis on cognitive factors have helped to clarify this complex situation of differential reaction to stressful situations, yet another aspect of the problem, moderator variables, must be explored. These moderator variables may be situational or external to the individual such as social supports, or they may be personal characteristics such as trait anxiety and sensation seeking or even internal physiological states such as that which occurs during menstruation. Several writers have pointed to the possible role of internal moderator variables (Dohrenwend & Dohrenwend, 1974; Rabkin & Struening, 1976; Rahe, 1978). This paper expands the definition of moderator variables to include variables in the environment as well. Both groups of moderator variables may help in better predictions of the effects of life stress.

The term life stress is usually used to refer to life changes that are stress-arousing and that are calls for action. Examples of these changes

include death or illness of family members, divorce, pregnancy, and marriage. Research has shown that while all persons experience life changes, high levels of change experienced within a relatively short period of time often have deleterious effects (Johnson & Sarason, in press). Life changes, and particularly negative life changes, have been linked to many physical indicators including heart disease, complications associated with pregnancy and birth, tuberculosis, multiple sclerosis, and diabetes, as well as the seriousness of several other conditions. Life changes also correlate negatively with academic performance, effectiveness in work situations, and job satisfaction.

Unfortunately, while many studies have found statistically significant relationships between life stress assessed by a life change score and a host of stress-related variables, these correlations have usually been quite modest. This finding suggests that life stress accounts for a relatively small proportion of the variance in the dependent measures employed and that by themselves life stress measures are not likely to be of value for purposes of prediction. While this poor ability to predict may be due, in part, to the inadequacies of life stress measures, it is likely that other factors are also involved.

It seems reasonable to assume that the effects of life stress are not the same for all persons. Some persons may be greatly affected by even moderate levels of life stress while others may show few effects even when experiencing high levels of change. A major limitation of research studies seems to be a relative lack of attention given to moderator variables, those which might mediate the effects of life change.

Situational Moderator Variables

One of the earliest life stress studies to consider the role of moderator variables was conducted by Nuckolls, Cassel, and Kaplan (1972) who examined

the relationship between life stress and pregnancy and birth complications. Women were administered the Survey of Recent Experience (Holmes & Rahe, 1967), a measure of life change, and a specially designed Psychosocial Assets Scale during the thirty-second week of pregnancy. The latter measure was designed to assess the degree to which the women possessed social support systems in their environment. Information concerning pregnancy and birth complications was also obtained for these women. Significant relationships between life change and complications were only found when the psychosocial assets measure was taken into account. For subjects with high levels of psychosocial assets, no relationship between life stress and complications was found. Life stress was, however, related to complications among those women with low levels of social supports. Given high life stress scores before and during pregnancy, women with low levels of psychosocial assets had three times as many pregnancy and birth complications as high life stress women with high psychosocial assets scores. These findings suggest that a high level of social supports in one's environment may moderate the effects of life stress.

Henderson and Bostock (1975) reported what would appear to be a particularly dramatic example of the role social supports play in how adults cope with stress. They described how seven crewmen of a small cargo vessel survived after their ship sank off the west coast of Tasmania. The men boarded an inflatable life-raft, drifted for nine days, experiencing wet, cold, and rough seas. One man died while they were in the life-raft and two other crewmen died shortly after reaching shore. Only a limited supply of fresh water and biscuits was available in the life-raft. Henderson and Bostock interviewed the men and obtained extensive information from them because of the unusual life-threatening experience they had lived through. Special attention was paid to the survivors' descriptions of behavior they considered to have been useful in maintaining morale and promoting effectiveness.

The most conspicuous aspect of the information obtained about the survivors was their preoccupation while on the raft with persons (wives, mothers, girlfriends) who represented significant social supports. The survivors both thought and talked among themselves about their closest family members. The combination of social supports in their personal lives together with the social supports they provided each other seemed to have had survival value. In this case social supports ameliorated the immediate situational stress but were not sufficiently potent to protect against delayed effects. Henderson and Bostock (1977) followed up the survivors for two years after their rescue and found that five of the seven had sought help for various types of psychological problems while the other two were living satisfying lives and looked back upon their miserable experience as a personally strengthening experience. The problems of the five who sought help included insomnia, nightmares, depression, and anxiety. The experience of short-lived extreme stress may carry a price in terms of subsequent self-preoccupation and maladaptation to life, even if social supports are important in immediate survival.

Sarason (1979) has recently demonstrated the potential of a laboratory approach to social supports. This series of experiments, discussed in a later section of the paper, showed that the effect of a social support could be produced either by discussion groups designed to foster group feeling or by a vicarious experience in which subjects witnessed a worried student being reassured about his ability to meet a coming intellectual challenge. Subjects observed the experimenter's unconditional acceptance of the subject.

Individual Difference Moderator Variables

In addition to external or situational moderator variables, individual difference variables or personality characteristics moderate or intensify the impact of certain other personal characteristics. For example, it is well

known that while intelligence level is related to many types of performance, anxiety level can also influence that relationship.

Anxiety

A number of test anxiety experiments have demonstrated that highly test anxious subjects perform as well as low anxious subjects in certain situations where either the task appears easy or performance demands are not emphasized. On the other hand, if the subject perceives the task as a difficult one, then the personality characteristic of anxiety is detrimental to good performance.

But even responses of the subject that seem unrelated to task performance may be affected by this interaction of test anxiety level and situational stress. Differing cognitions characteristic of high and low test anxious subjects may affect such seemingly unrelated behavior as time estimation. In a series of studies, Sarason and Stoops (1978) used the Test Anxiety Scale (TAS) in testing hypotheses about both performance and cognitive processes. The investigation comprised a series of three experiments concerning subjective judgments of the passage of time. After being given either achievement-orienting or neutral instructions, subjects waited for an undesignated period of time, after which they performed an intellectual task. The achievement-orienting manipulation involved telling the subject that the task was a measure of intelligence. The dependent measures were subject's estimates of the duration of the waiting and performance periods and their scores on the assigned tasks.

The experiments were aimed at providing information about the way in which individuals differing in anxiety fill time. In two experiments not only was the performance of high TAS subjects deleteriously affected by achievement-orienting instructions, but these subjects also tended to over-estimate both the duration of the test period and the period during which they waited to have their ability evaluated. This appears analogous to the

tendency to exaggerate time spent in such places as a dentist's waiting room and office. Anticipating and going through unpleasant, frightening, or threatening experiences seem to take up a lot of time. If this interpretation is correct, the question arises: Do individuals differing in anxiety fill time periods in similar or dissimilar ways? The third experiment dealt with this question.

In the third experiment of Sarason and Stoop's study, college students worked on a digit-symbol task prior to a waiting period and then were asked to solve a series of difficult anagrams. Finally, the subjects responded to a questionnaire dealing with their cognitive activity during the anagrams task. The subjects were 60 female undergraduates. The experimental design encompassed two factors: a) high middle, and low TAS scorers; and b) achievement-orienting and neutral instructions. Each subject worked on the digit-symbol task for four minutes. This was followed by a four minute waiting period. At the end of the waiting period, subjects performed for 18 minutes on the anagrams. The experiment concluded with subjects responding to the Cognitive Interference Questionnaire which assessed how often preoccupying thoughts occur.

Waiting period time estimates were positively correlated with anxiety and there was a significant interaction between test anxiety and the instructional conditions. This was attributable to the higher time estimates mean obtained by the high TAS group that received achievement-orienting instructions. Table 1

Insert Table 1 about here

presents the means of the four dependent measures for all groups in the experiment.

The analysis of estimates of duration of the anagrams task yielded the same two significant factors, for Test Anxiety and Test Anxiety X Conditions. Again, the significant results were related to the relatively large time

estimates given by the high TAS achievement-orientation group (see Table 1).

When an analysis was performed on the number of correct responses to the anagrams task, only the Test Anxiety factor was statistically significant. As the means in the third column of Table 1 show, this effect was due mainly to the relatively poor performance of the high TAS group receiving the achievement-orienting instructions.

Test Anxiety and Test Anxiety X Conditions also produced significant results in the analysis of Cognitive Interference Questionnaire scores. Again, most of the interaction effects were due to the high scores obtained by the high TAS achievement-orientation group. Results for separate analyses of individual questionnaire items were in every case in the same direction as the results presented for the questionnaire as a whole.

An item appended to the questionnaire asked the subjects to indicate on a seven-point scale the degree to which their minds wandered while working on the anagrams task. An analysis of variance of these scores also yielded significant factors for Test Anxiety and Test Anxiety X Conditions.

These results demonstrate that individuals for whom danger in evaluative situations is particularly salient (high test anxious people) tend to overestimate to a greater degree than do others both the time during which their performance is evaluated and the period during which they are waiting for the evaluation to take place. Highly test anxious subjects performed at significantly lower levels than low and middle scorers when emphasis was placed on the evaluational implications of performance. Perhaps this can be explained by cognitive interference occurring during both the waiting and evaluation periods. Highly test-anxious scorers, more so than low and middle scorers, attribute to themselves preoccupations about how poorly they are doing, how other people are faring, and what the examiner will think about the subject. Although a measure of cognitive interference during the waiting

period was not obtained, it seems likely that similar preoccupations would have characterized highly test anxious subjects then, too.

Sensation Seeking

Another individual difference moderator variable has been suggested by the results of a recent study conducted by Smith, Johnson, and Sarason (1978). In this study subjects were administered the Life Experiences Survey (LES) (Sarason, Johnson, & Siegel, 1978), a measure of recent positive and negative life events, and the Sensation Seeking Scale (Zuckerman, Kolin, Price, & Zoob, 1964). The Sensation Seeking measure employed is an instrument designed to assess the tendency of individuals to engage in thrill seeking, risk taking activities. High scorers on this measure seem to like high levels of stimulation, while those scoring low on the scale define a low level of stimulation as most optimal. Thus, low sensation seekers are thought to often try to minimize arousing stimulus input. Smith et al. reasoned that if the Sensation Seeking measure, in fact, reflects one's optimal level of stimulation or arousal, low sensation seekers should be more adversely affected by life stress than high sensation seekers who are presumably more tolerant of change. Results in line with this hypothesis were obtained. A later study using a different measure of sensation seeking replicated these results (Johnson & Sarason, in press).

Locus of Control

The degree to which the person perceives events as being under his/her personal control may also serve as a moderator for life change events. Johnson and Sarason (in press) recently reported results that support such a relationship. In that study subjects were given the Rotter (1966) Locus of Control Scale, the LES, the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970), and the Beck (1967) Depression Scale. The Locus

of Control Scale assesses individuals' perceptions of control over their environment. Low scorers (internals) are thought to perceive environmental reinforcers as being under their personal control. High scorers (externals) are believed to view reinforcers as being controlled by fate, luck, or powerful others. There is considerable evidence that this measure reflects subjects' perception of their own control over environmental events.

Since experiencing life changes which persons feel unable to control might be expected to result in increased anxiety and depression, it was expected that the highest levels of anxiety and depression would be found with high life stress subjects external in their locus of control orientation. A high level of negative life changes was found to be significantly correlated with measures of both trait anxiety and depression, but only for externals. While it is difficult to infer cause and effect relationships from them, these findings are consistent with the notion that people are more adversely affected by life stress if they perceive themselves as having little control over their environment.

Experimental work such as the Sarason and Stoops study illustrates that even behavior which does not seem logically related to test anxiety may be affected by this individual difference variable. Other research suggests that the effects of individual differences may be even more subtle. The importance of these individual difference variables invades even the insulated sanctuary of the well controlled psychology laboratory where research on topics such as memory and attention is carried out. Broadbent (1977) and Neisser (1976) both recently discussed the role of individual differences in preattentive processes, seemingly automatic features of information-processing involved in the detection and analysis of information. Broadbent (1977, p. 110), for example, has referred to factors other than those resulting from experimenter's instructions which, " . . . may not always be reportable, and

which nevertheless may cause attention to be caught by this stimulus rather than by that, in a way that is systematic rather than random." What subjects bring to the laboratory (attitudes, predilections, fears, information) exert influences over their performances and they may be as unaware of these influences as is the experimenter. Thus, individual difference variables may affect performance in ways most theorists have not even considered. An interesting possibility would be to approach this problem from the standpoint of the factors that inhibit a person's ability to attend to potential sources of danger in the environment. Defense mechanisms can be reformulated in terms of cognitive styles defined as the predominance of a variety of rigid, limiting constructions of events and plans for action. It is perhaps because of the individual differences in these cognitive styles that Neisser (1976) has called for a widening of cognitive psychology's purview to include events of everyday life.

Physiological State Moderator Variables

A classic experiment by Schacter and Singer (1962) demonstrated that the heightened physiological state produced by administration of adrenalin affected subjects' reactions to an emotion-producing situation. This was true, however, only when the subjects were misinformed about the expected effects of the injected adrenalin. When they were aware of the expected effects, their behavior did not differ from that of control subjects. The physiological state of the misinformed subjects served as a moderator variable that affected what behavior was shown under stress. Similarly other physiological states may serve as moderators of stress reactions. It seems likely that the physiological changes caused by periods of sleep deprivation or by nutritional state serve as moderators of the person by situation interaction.

In one experiment that has addressed this topic, Siegel, Johnson, and Sarason (1978) investigated the relationship between life stress, as assessed by the LES, and menstrual discomfort. A significant relationship between negative life change and discomfort was obtained, but only for women not taking oral contraceptives. The relationship between life stress and menstrual discomfort seems to vary with oral contraceptive usage.

THE INTERACTION OF MODERATOR VARIABLES

Not only do moderator variables serve as mediators between the situations and individual's responses, but moderator variables sometimes interact. Study of these interactions can further clarify what is occurring in the person by situation interaction and enable researchers to predict outcomes more effectively for groups differing in specific situational and personal characteristics.

In a recent series of experiments, Sarason (1979) studied subjects who differed in test anxiety and whose social support level was experimentally manipulated. Subjects with high, middle, and low scores on the Test Anxiety Scale (TAS) (Sarason, 1978) performed on a difficult anagrams task either under a neutral or experimental condition. The experimental condition emphasized that ability to solve the anagrams was related to intelligence and likelihood of success in doing college-level academic work. Previous research had shown that highly test anxious people perform relatively poorly under this condition and that their performance is hindered by excessive self-preoccupations concerning failure and its consequences (Sarason & Stoops, 1978).

A second experimental variable was the opportunity for social supports. While half the subjects performed only on the anagrams, subjects under the social support condition participated in a prior 20 minute group discussion. These discussions were attended by six subjects who were asked to discuss a series of questions about their academic experiences. The questions included:

"Are stress and anxiety about exams important problems here at the University of Washington?"

"How often do you share your worries about tests with other students?"

"What are the barriers to this sharing of personal concerns?"

"Do you feel this discussion has brought you closer to people who otherwise would just be 'other' students?"

Except for suggesting the specific topics, the discussions were free-wheeling. In addition to the six subjects, two confederates were present at the discussions. Their roles were to 1) stimulate discussion and keep it going if necessary, 2) positively reinforce comments made by participants and build group feeling and a sense of sharing, and 3) at the end of the discussion say that the discussion had been valuable for them, comment on the degree of compatibility among the group members and suggest that the members get together after completion of the experiment to see if an informal meeting could be arranged for continuing the discussion. This condition was designed to heighten the sense of social association and shared values among group members.

Consistent with findings of previous research, the high TAS subjects performed more poorly under the condition which emphasized the evaluative aspect of subjects performance. Subjects who participated in the group discussions performed at a higher level than did subjects who did not. Of particular interest was the Test Anxiety X Social Support interaction (see Figure 1). Comparisons for each of the three levels of test anxiety yielded

Insert Figure 1 about here

a significant difference between the social supports experimental and control groups only for high TAS subjects. Although the TAS X Instructions X Social Supports interaction only approached a statistically significant level, for

subjects in the high test anxiety group who received the evaluative instructions, those who also participated in the group discussions performed on the anagrams at a higher level than those who did not.

Earlier, anxiety was depicted as a self-preoccupying reaction to stress. Among the hallmarks of anxiety are thoughts of personal inadequacy and helplessness. The results of this experiment suggest that association with others and hope of its continuation may reduce the potency of these thoughts even when the threat of evaluation is present. As anxious self-preoccupation decreases, the opportunity for task-oriented thinking increases with consequent improved performance.

In the social supports experiment just described, the factor studied was group association. A second experiment explored another dimension of social supports, acceptance. Test anxiety scores were again used as a measure of individual differences in self-preoccupation aroused by an evaluative call for action. An anagrams task administered in groups and instructional conditions similar to the ones employed in the experiment just described were used. Social support was provided vicariously for half the subjects. This was done by having a confederate raise his hand after the experimenter had introduced the anagrams task and say, "I don't think I can work these problems. They get me all upset. I'm no good at them." The experimenter responded with, "You're not the only person who clutches up in this kind of situation. I can tell from the fact that you took the initiative to tell me how you feel that you're an intelligent person. Just do your best. That's all anybody can expect. I think you have more ability than you give yourself credit for."

There were four experimental groups treated with 1) evaluative instructions, 2) social support, 3) evaluative instructions and social support, and 4) a control group. The sixteen subjects under each condition were divided into

high and low TAS groups. The effects for social support and the interaction between test anxiety and social support were statistically significant ($p < .05$ and $p < .01$, respectively). Table 2 gives the cell means for the eight groups. While high TAS subjects

Insert Table 2 about here

performed more poorly than the low TAS subjects under the evaluative instructions, their performance was equal to or better than the low TAS groups for the two conditions in which support was present. What was the nature of the support provided? The intention was to create a condition in which the subjects could observe a peer who was listened to with respect and interest. The emphasis was on the experimenter's unconditional acceptance of the subject. This was based on the idea that when a person feels valued, anxious self-preoccupation will be reduced. Although the evidence presented here obviously does not provide information about other self-preoccupying thoughts such as anger, similar results might be found for them.

CONCLUSION

A cognitive approach can be valuable in better specifying what goes on in a person X situation interaction. It is beginning to lead to research that will better clarify the factors involved in such an interaction and also suggests coping techniques for rendering situations less stress engendering for the individual.

Moderator variables, personal (related to personality characteristic or physiological state) or situational, can play a major role in individual response to a stress producing situation. Social supports, a situational variable, seems to function as a moderator of the effects of stressful life events. Personality characteristics, such as sensation seeking and locus of control, and physiological states seem to perform the same function. Of even

greater interest is the interactive effect of these moderator variables. This type of interaction was illustrated by experimental work that assessed the effects of a stressor on subjects who differed in test anxiety level, an individual difference moderator, and experimentally constructed social supports, a situational moderator.

It seems reasonable to conclude that a number of specific variables may mediate the effects of stress. To the extent that these moderator variables influence the effects of stressors such as life change, the finding of low correlations between measures of the stressor and dependent measures is to be expected when such variables are not taken into consideration.

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Table 1

Mean Waiting Time & Task Time Estimates, Anagram Performance Scores,
& Cognitive Interference Scores (Sarason & Stoops, 1978)

| | Waiting Time Estimate (seconds) | Task Time Estimate (seconds) | Anagrams Score | Cognitive Interference Score |
|-----|---------------------------------------|------------------------------------|-------------------|------------------------------------|
| H-E | 357.0 | 1354.1 | 3.3 | 33.2 |
| H-C | 286.5 | 1114.0 | 4.8 | 24.6 |
| M-E | 266.3 | 1031.5 | 5.5 | 18.2 |
| M-C | 274.4 | 1103.5 | 5.7 | 21.6 |
| L-E | 266.5 | 1172.0 | 5.0 | 19.8 |
| L-C | 265.0 | 1140.5 | 5.0 | 21.4 |

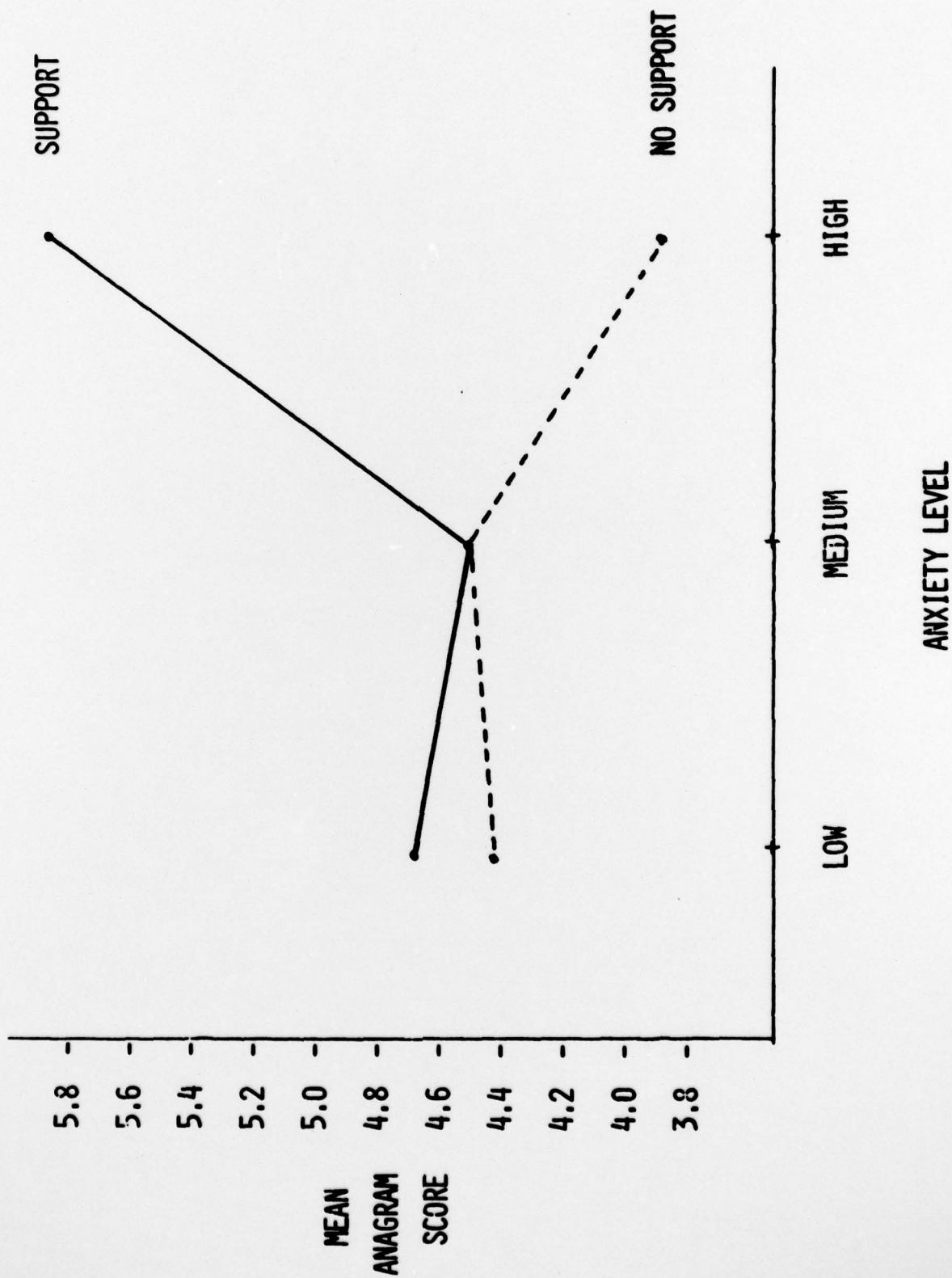
Note: H, M, and L refer to levels of test anxiety; E and C refer to
experimental (achievement-orientation) and control conditions.

Table 2

Mean Anagram Performance as a Function of Test Anxiety
and Experimenter's Supportive Comments (Sarason, 1979)

| Test Anxiety | Conditions | | | |
|--------------|-------------------------|------------------------|---|---------|
| | Evaluative Instructions | Experimenter's Support | Evaluative Instruction & Experimenter's Support | Control |
| High | 2.9 | 6.5 | 5.0 | 3.8 |
| Low | 5.4 | 4.4 | 4.8 | 3.8 |

FIGURE 1
MEAN ANAGRAM PERFORMANCE AS A FUNCTION
OF TEST ANXIETY AND SOCIAL SUPPORTS (SARASON, 1979)



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